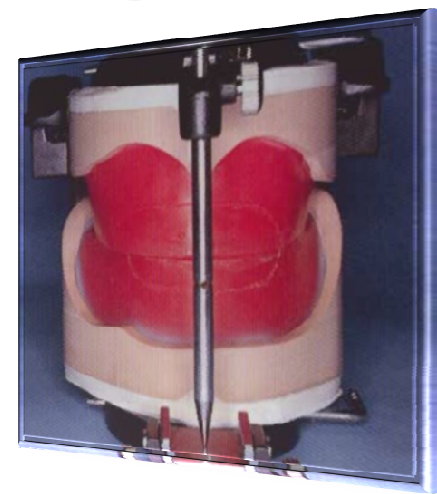


Maxillo-mandibular Relations



TERMINOLOGY

○ Record :

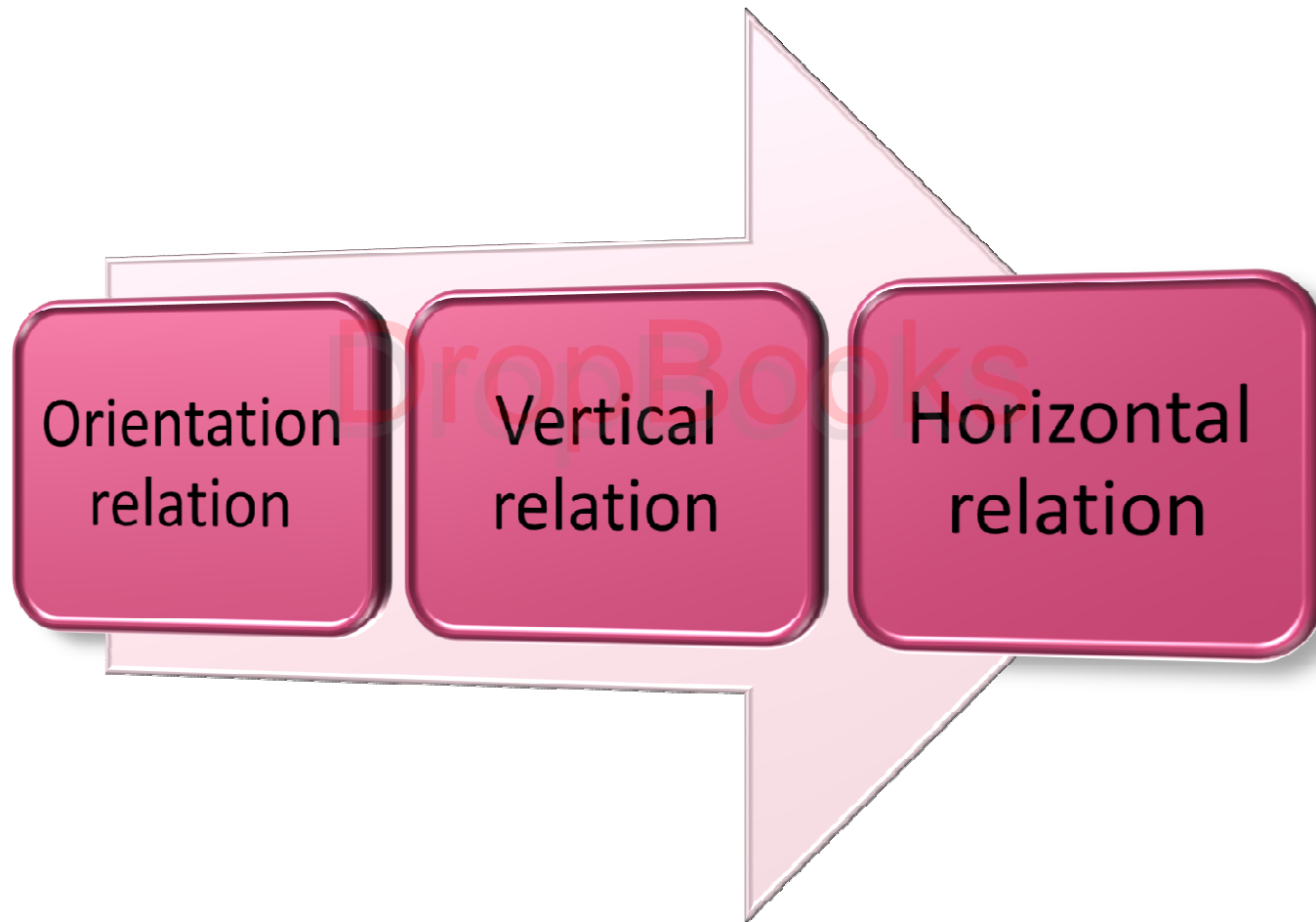
- This is a registration of a define position. Any position of the mandible is related to the maxilla in the three dimensions of space. So the record is three dimensional.

○ Maxillo-mandibular relation record:

- a registration of any positional relationship of the mandible relative to the maxillae. These records may be made at any vertical, horizontal or lateral orientation.



CLASSIFICATION OF JAW RELATIONS



CLASSIFICATION OF JAW RELATIONS

○ ***Orientation relation:***

- It establish the reference in the cranium.

○ ***Vertical relation:***

- it establish the amount of jaw separation allowable for denture use .

○ ***Horizontal relation:***

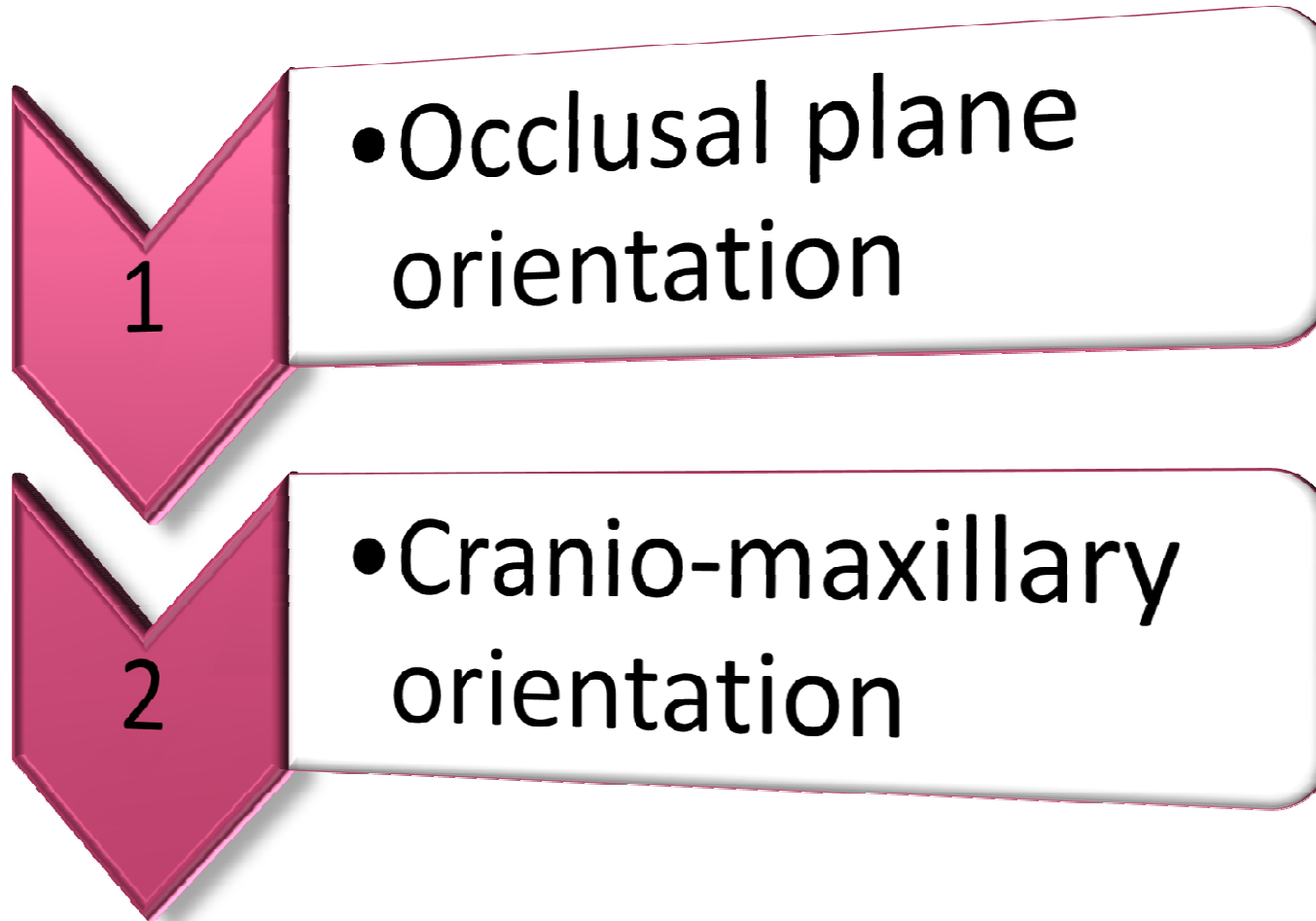
- It establish the antero-posterior and lateral relationship of the mandible to maxilla.



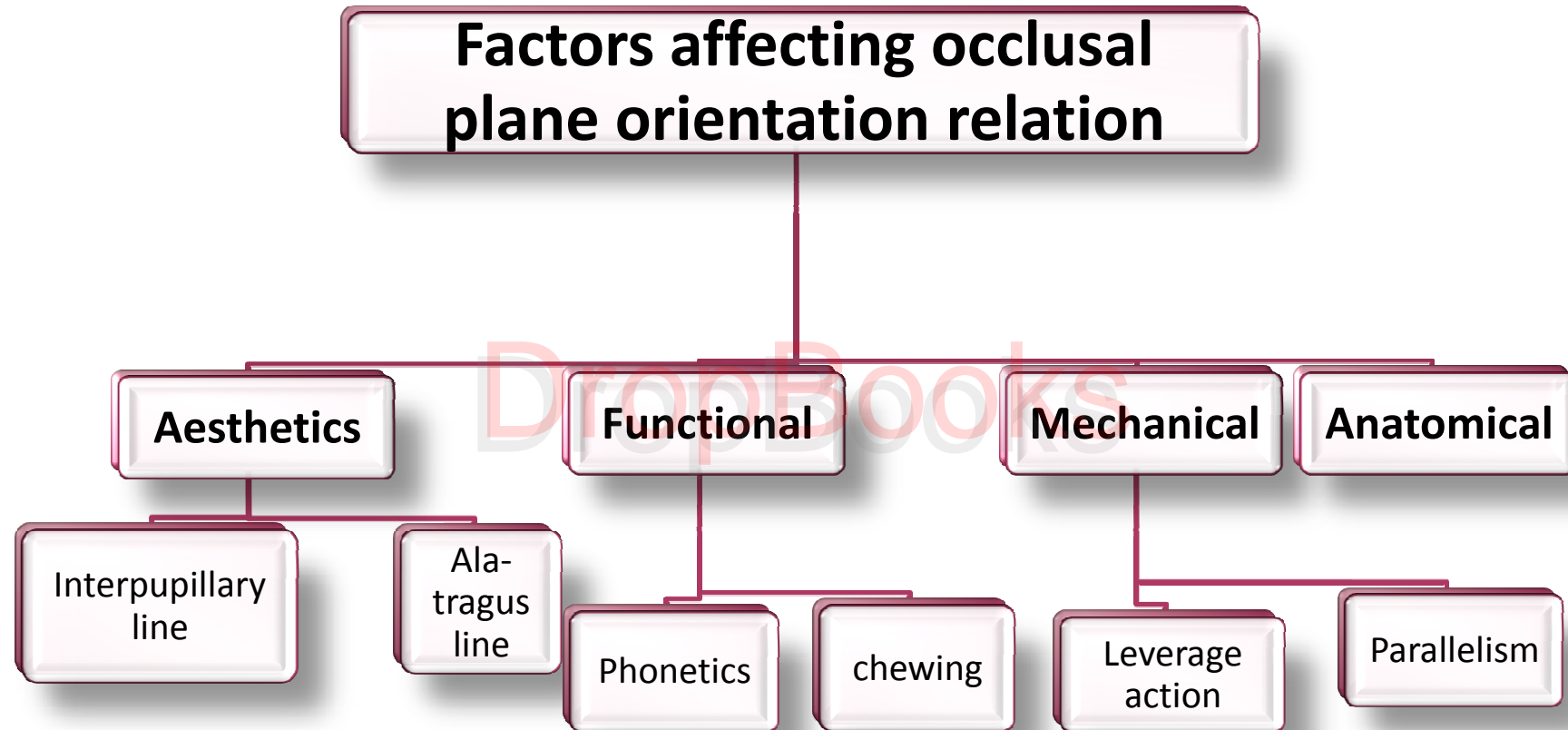
Orientation Relation

DropBooks

ORIENTATION RELATIONS



OCCLUSAL PLANE ORIENTATION RELATION

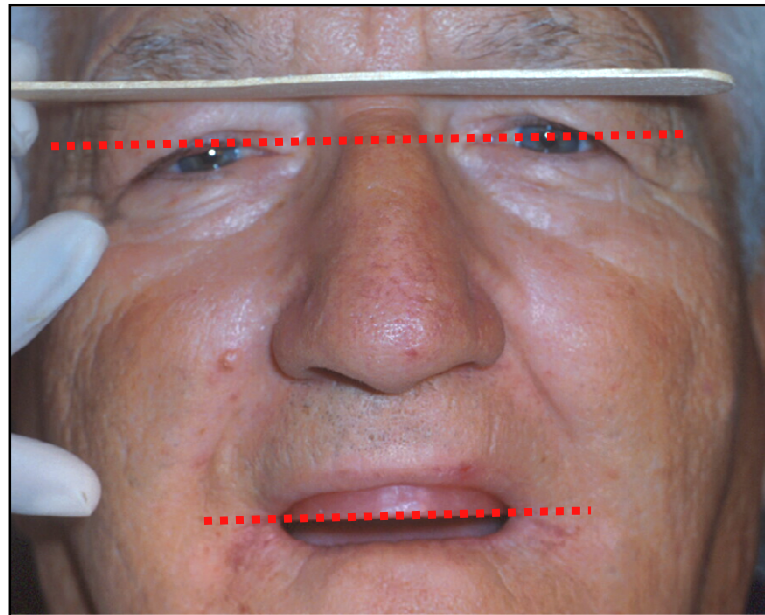


I- AESTHETICS

- The anterior occlusal plane (incisal plane) should be 2 mm below relaxed lip and parallel to



INTERPUPILLARY LINE



Before adjustment



After adjustment

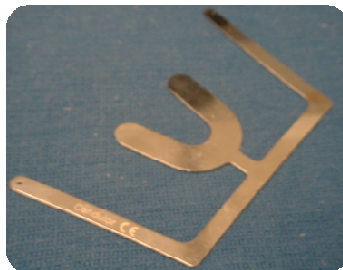
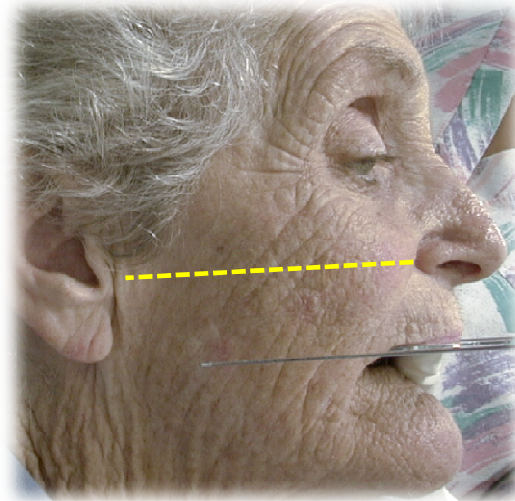
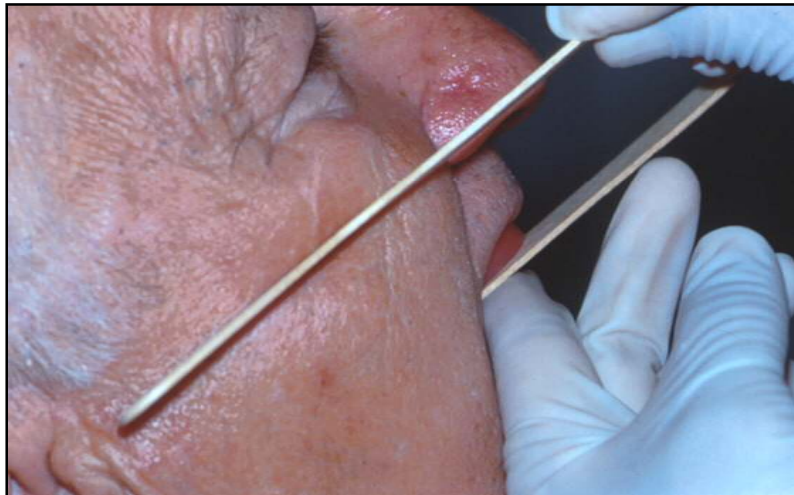


- **With the lips at rest the wax rim should project 1-2 mm below the lip line.**



AESTHETICS

- The occlusal plane posteriorly should be adjusted to be parallel to **ALA-TRAGUS LINE** (camper's plane)



A ***Fox Plane indicator*** can be used to help properly orient the occlusal plane.



- In case of *short upper lip* and superior protrusion

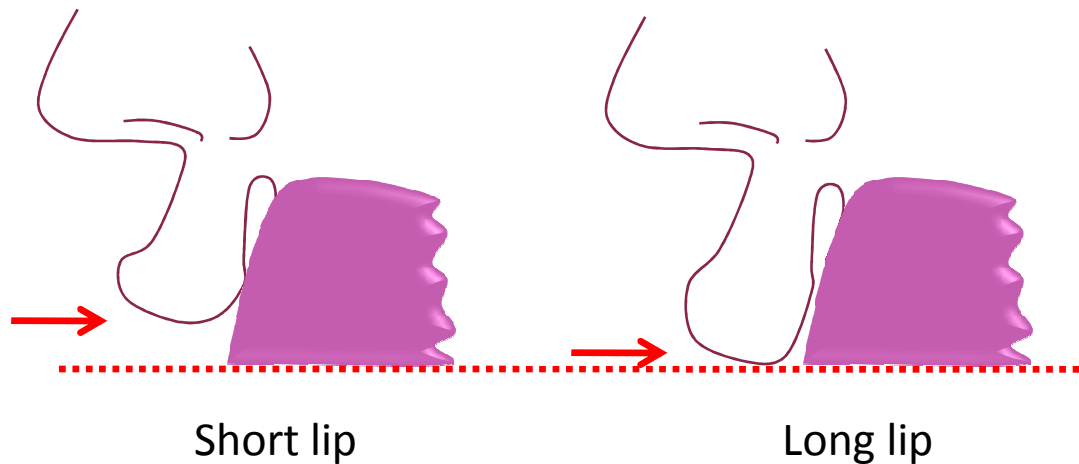


More amount of occlusion rim is shown

- In case of *long upper lip* and loss of lip muscles tone (most old age)

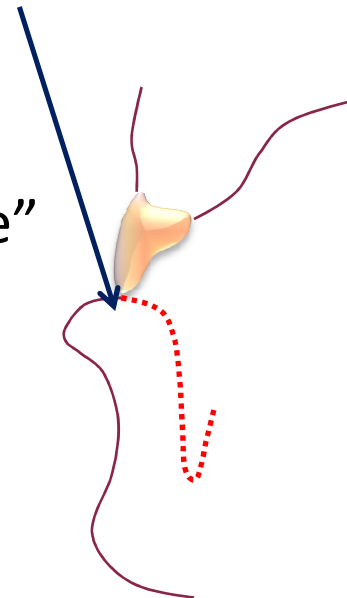


less amount of occlusion rim is shown



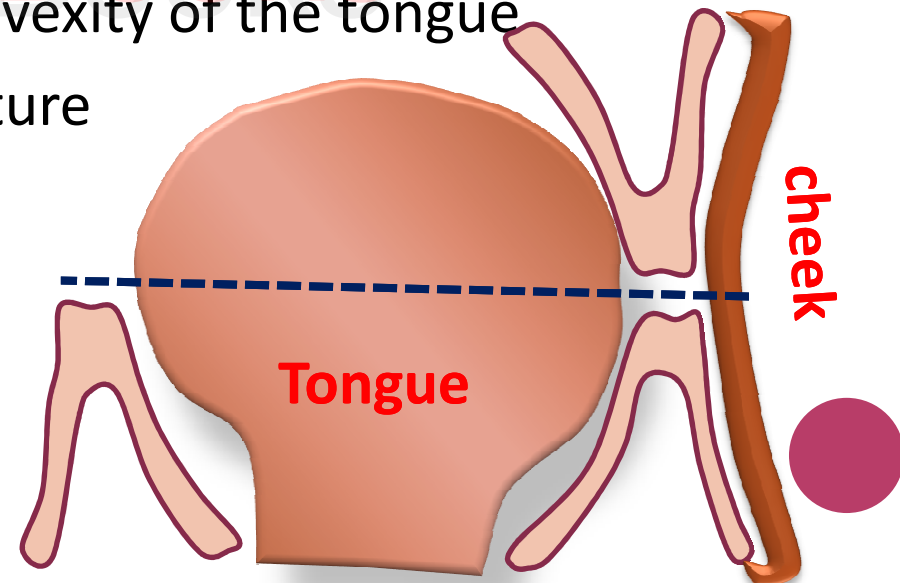
II- FUNCTIONAL

- **Phonetics** is a helpful guide for the vertical orientation of the anterior occlusal plane.
- During the production of Dento-labial letters like V, F, PH the incisal edges are brought in contact with the junction between transition epithelium and labial mucosa.
- This could be checked by asking the patient repeat “fourty five” or “fifty five”



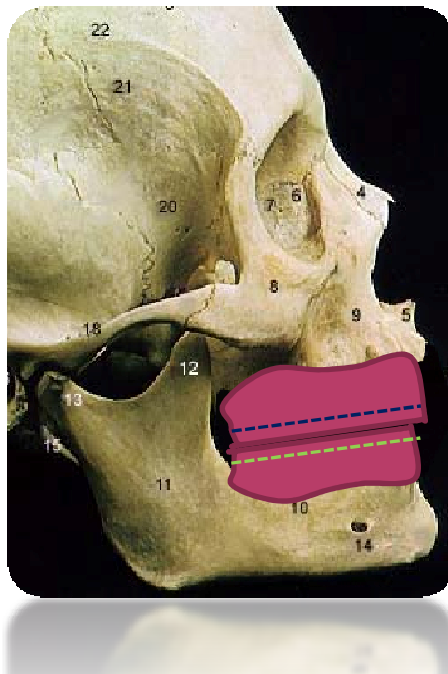
II- FUNCTIONAL

- The muscular activity during **chewing** cycle could be used as guide for occlusal plane level.
- Both the buccinator muscle and the tongue work in coordination to keep the food on the occlusal table.
- It is more advantageous to make the level of the occlusal plane below the greatest convexity of the tongue
- This also enhance lower denture stability.



III- MECHANICAL

- The nearer the occlusal plane to the basal bone of the jaws, the less the **leverage action** and the better the stability.
- To favour the stability of an arch ,the occlusal plane may be made more closer to the weak arch.

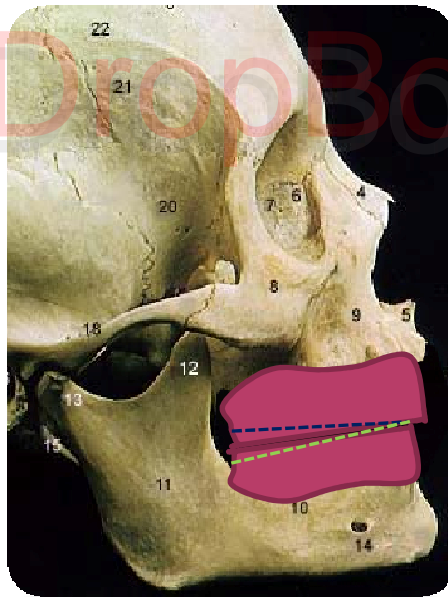


----- Favour maxilla
----- Favour mandible



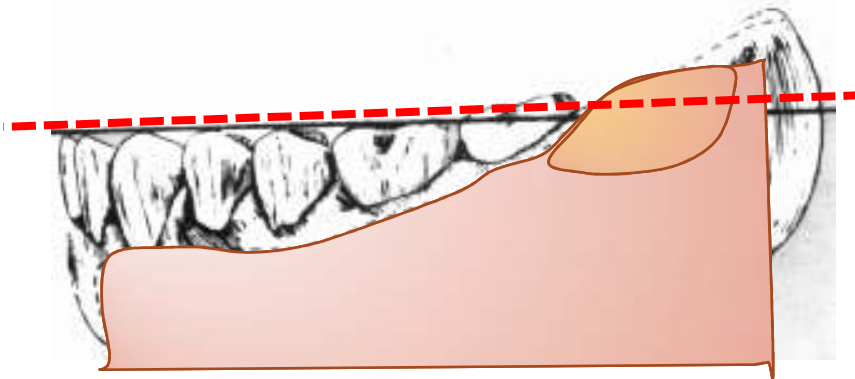
III-MECHANICAL

- The occlusal plane should be **parallel** to both ridges. As a result the masticatory forces are perpendicular on the ridges avoiding the horizontal displacement of the denture.



IV- ANATOMICAL

- Lower occlusal plane could be guided anatomically by the *corner of the mouth* anterior and *half or two third of the retromolar pad* posteriorly.

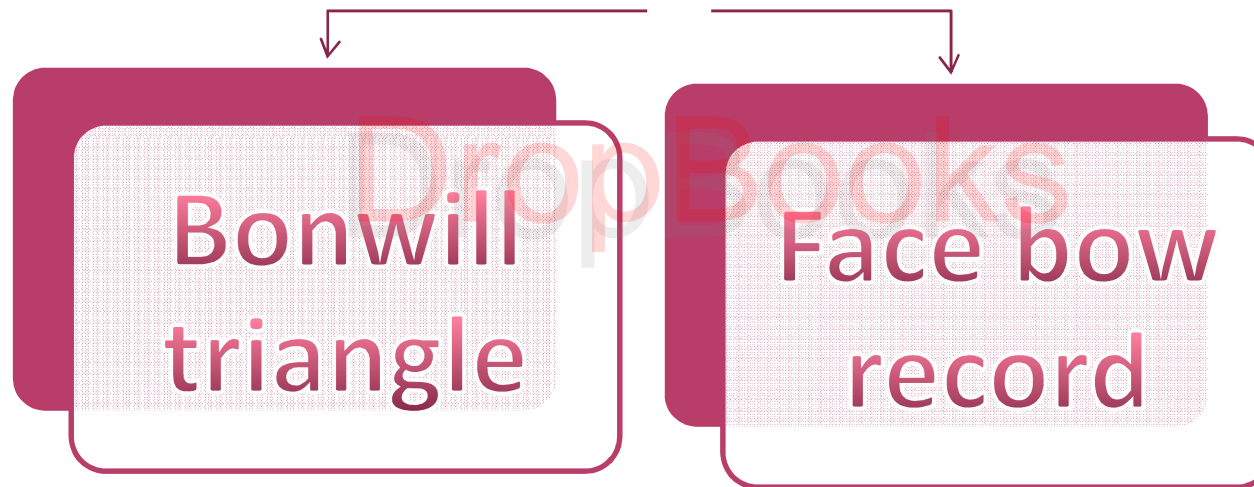


Less than half retromolar pad



CRANIO-MAXILLARY ORIENTATION RELATION

- This is the relationship between the maxilla and TMJ or cranium.
- This orientation relation is recorded either with



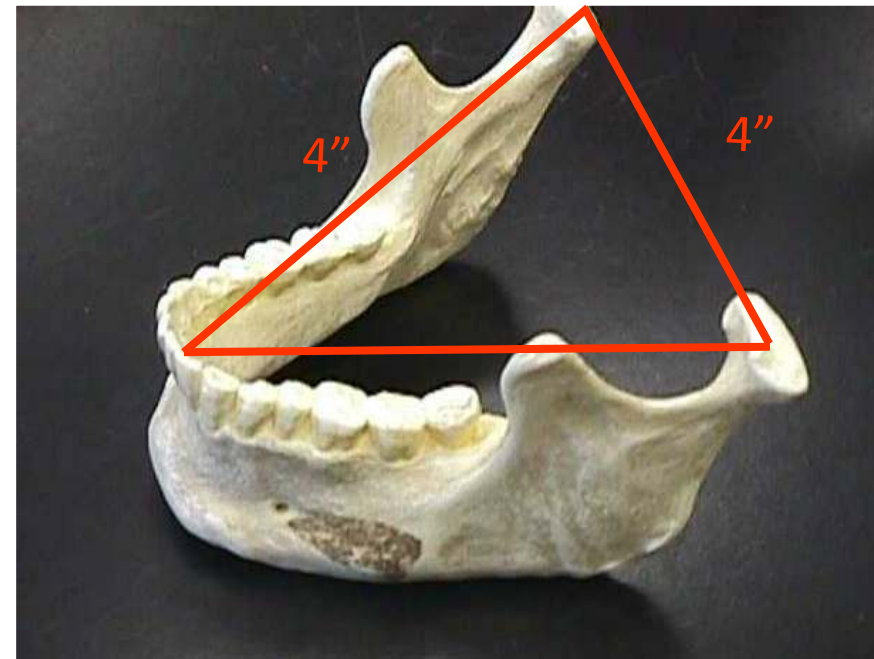
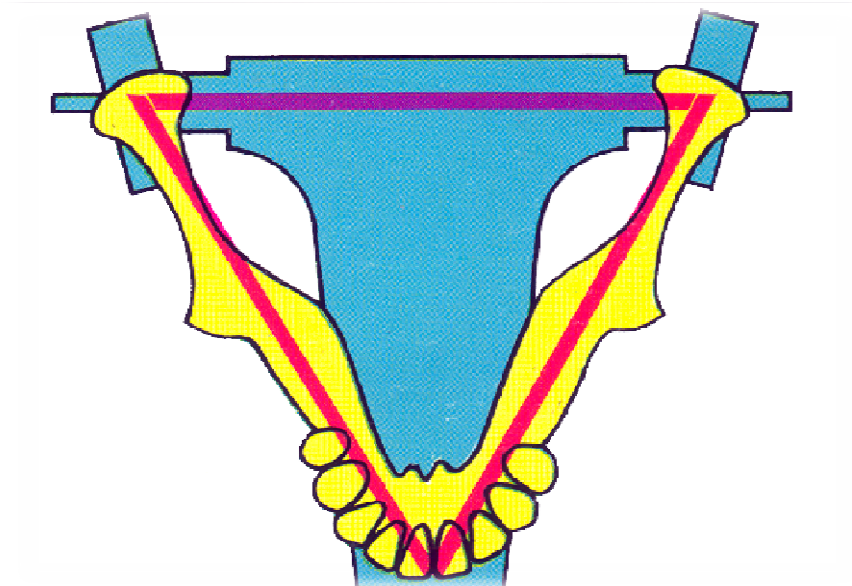
In case of mean value articulator

In case of adjustable articulator



○ Bonwill Triangle:

- It is an equilateral triangle with a 4 inch (10 cm) distance between the condyles and between each condyle and the incisor point.



○ Face Bow :

- It is a caliper like device that is used to record the relationship of the maxilla to the TMJ and transfer this relation from the patient to the articulator.
- **Function of the face bow:**
 1. Locate the terminal hinge axis using kinematic face bow.
 2. Relate the maxillary cast to rotating axis of the articulator in the same relationship as the maxilla is related to the mandibular hinge axis.
 3. Relate the mandibular cast to the hinge axis by centric relation record.
- **Terminal hinge axis:** it is an imaginary line extending between the two condyles around which the condyles can rotate without translation.



Methods of locating the hinge axis:

kinematically

Determine the actual hinge axis at predetermined hinge axis and recorded using mandibular (kinematic face bow) or pantograph.



Arbitrary

11- 13 mm anterior to superior border of the tragus at a canthus tragus line.



Types of face bow



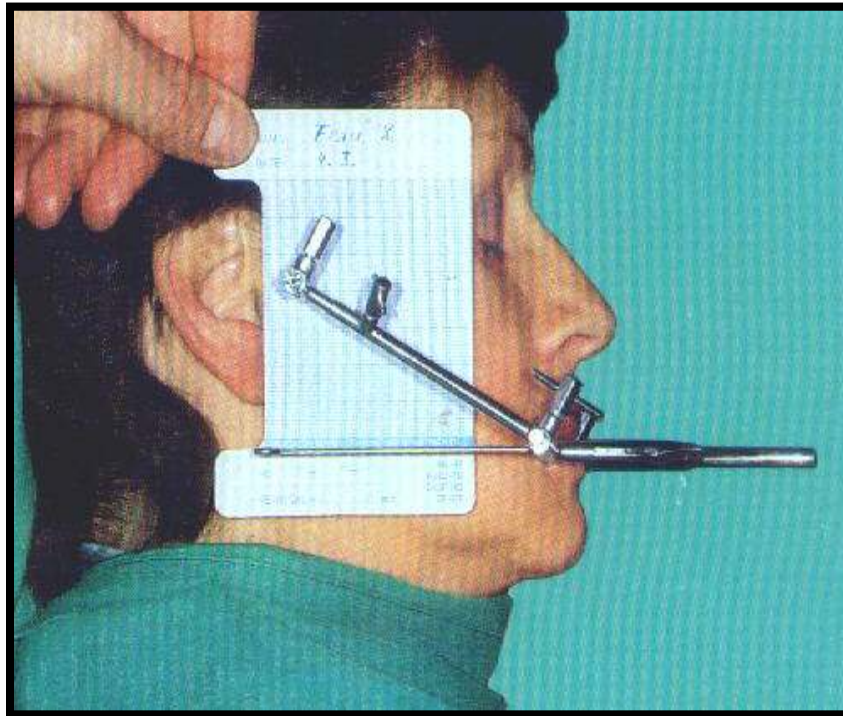
**Maxillary
face bow**

**Mandibular
face bow**



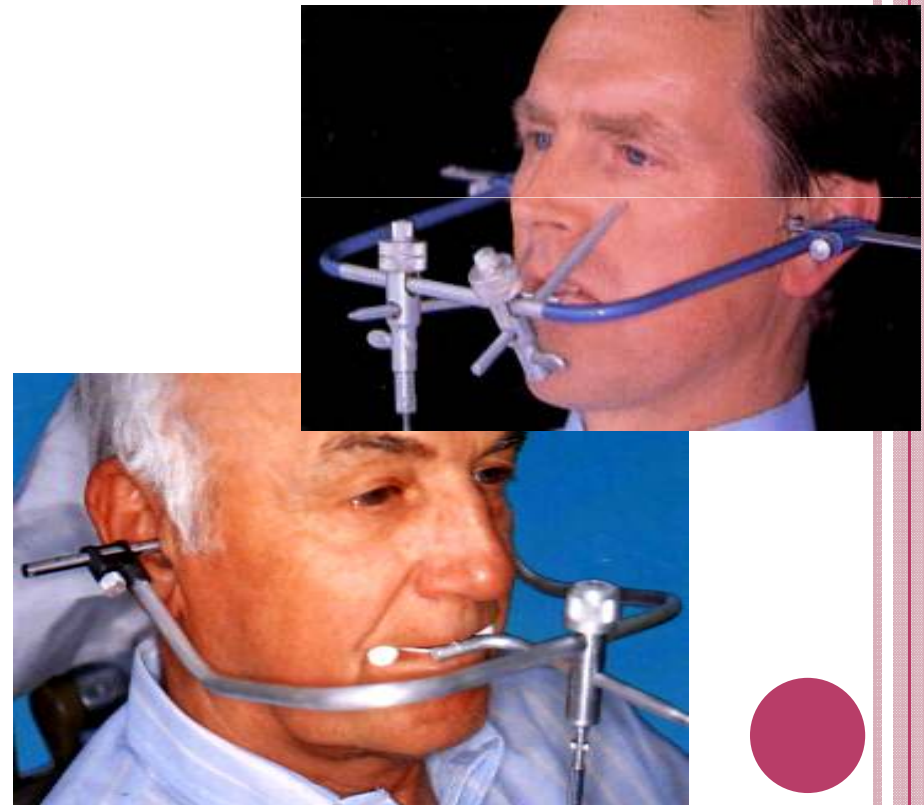
- Types of face bows:

Mandibular (kinematic) face bow



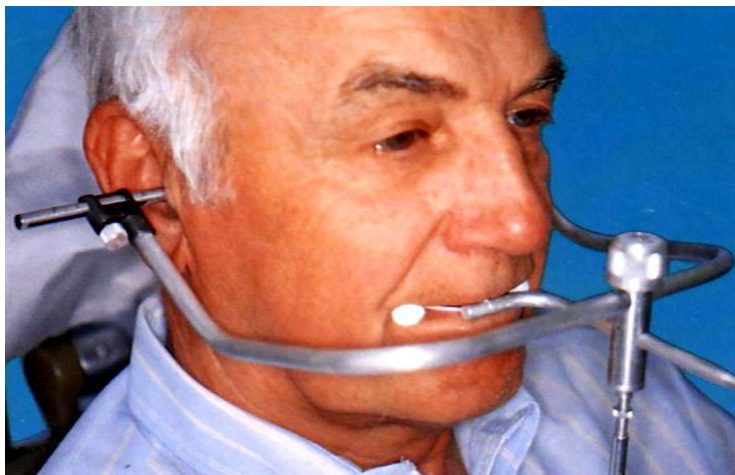
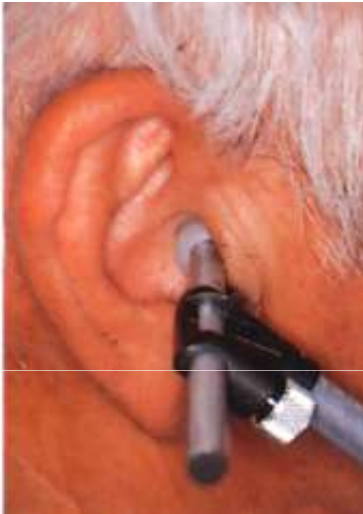
de

Maxillary (arbitrary) face bow

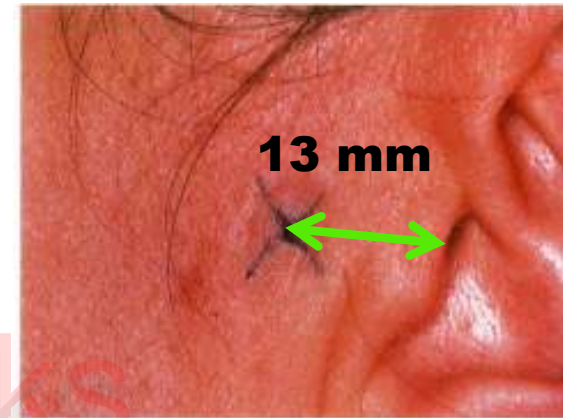


○ Maxillary face bow:

- Ear bow



- Face bow



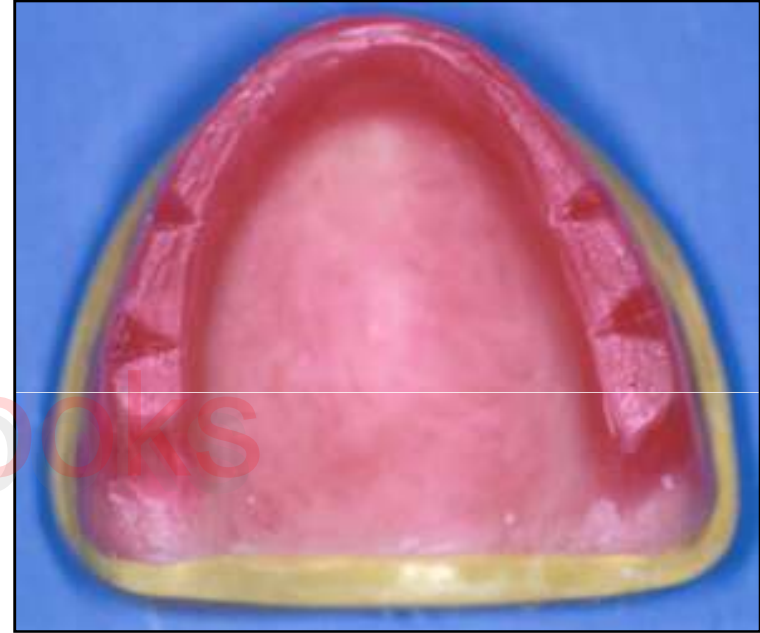
FACEBOW TRANSFER RECORD

Armamentarium

- Compound
- Water bath
- Alcohol torch
- Vaseline
- Red handled knife
- Facebow



FACEBOW TRANSFER RECORD



- Place notches in the maxillary wax rim as shown



FACEBOW TRANSFER RECORD

- Index wax rim to bite fork with compound as shown

Vaseline



Thin layer



Soften compound



Temper



Center midline



FACEBOW TRANSFER RECORD



- Have the patient position the ear pieces.
- Place the nose piece on the bridge of the nose. This will provide support for the entire earbow apparatus.



FACEBOW TRANSFER RECORD



- Position the 3rd point of reference at the base of the ala.
- The earpieces can be adjusted up or down to level the bow parallel to the interpupillary line.



FACEBOW TRANSFER RECORD

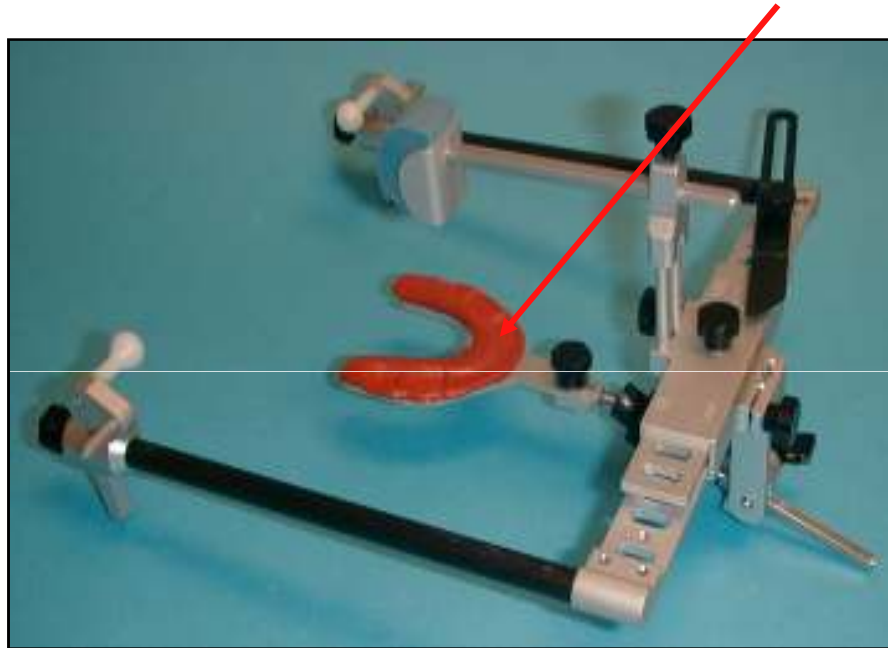


- The record base, wax rim and bite fork are now inserted in the patients mouth and connected to the facebow.



FACEBOW TRANSFER RECORD

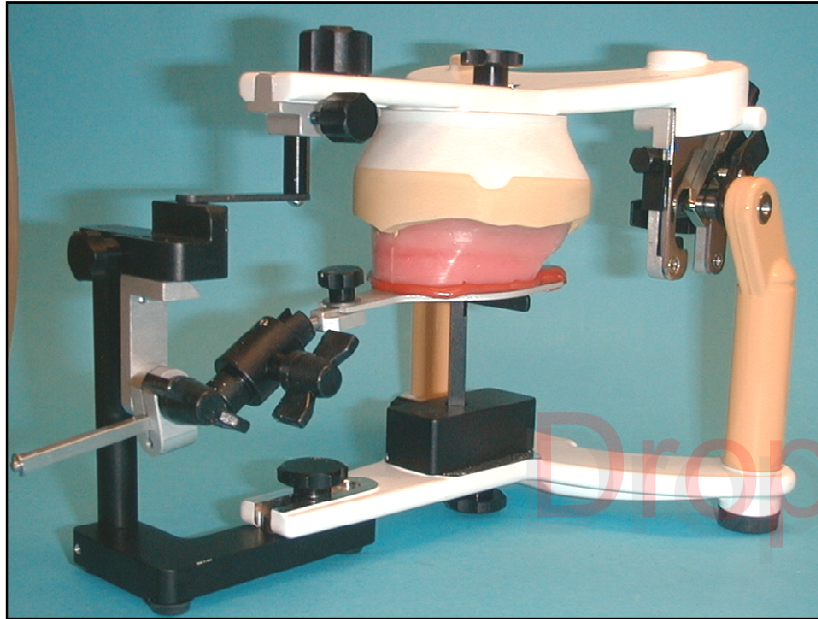
The record on the bite fork is indexed to the maxillary wax rim



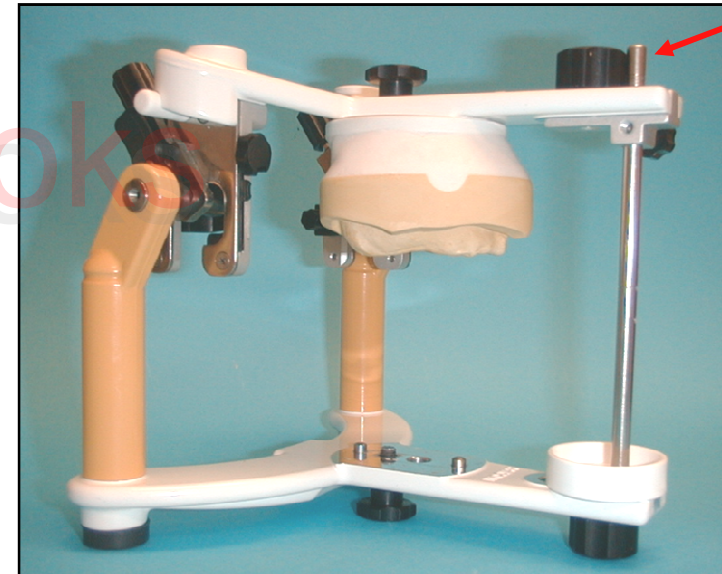
- Remove the facebow from the patient. Insert the maxillary cast into the record on the bite fork and attach the cast and face bow to the articulator with the mounting jig.



FACEBOW TRANSFER RECORD



Reminder: Before mounting the upper cast, make sure the incisal guide pin is at zero and in contact with the incisal guide table.



The left side of the slide features a series of vertical stripes in various shades of purple and magenta. Overlaid on these stripes are several circles of different sizes, also in shades of purple and magenta, creating a modern, abstract design.

Vertical Relation

VERTICAL RELATIONS

- It is the vertical measurement of the face between any two arbitrary points one above and one below the mouth in the midline.
- **Vertical dimension of occlusion:** it is the vertical measurement of the face when the teeth are in occlusal contact.
- **Vertical dimension of rest:** Vertical dimension of the face when the head is upright and the elevator and depressor muscles are in equilibrium in tonic contraction.
- **Free way space (inter-occlusal distance):** it the difference between vertical dimension of rest and vertical dimension of occlusion.





VDR

—

VDO

=

Free way space

2-4 mm



○ Variability of rest position:

- Short term variables:

1. **Head posture** → increased by tilting head backward
2. **Stress** → decreased by stress
3. **Teeth extraction** → decrease following extraction
4. **Pain** → decrease by pain in the mouth or belong to it
5. **Respiration** → increase during inspiration



○ Long term variables of the vertical dimension:

1. Age and health status

A decrease in the rest vertical dimension usually accompany prolonged period of edentulism.

2. Bruxism

Mainly abnormal habits are usually associated with muscular hypertonicity with a resultant decrease in the vertical dimension of rest.



METHODS OF DETERMINING

1. *Esthetics*

- **The lips** —————→ should come into a relaxed and easy contact.



Reduced vertical dimension



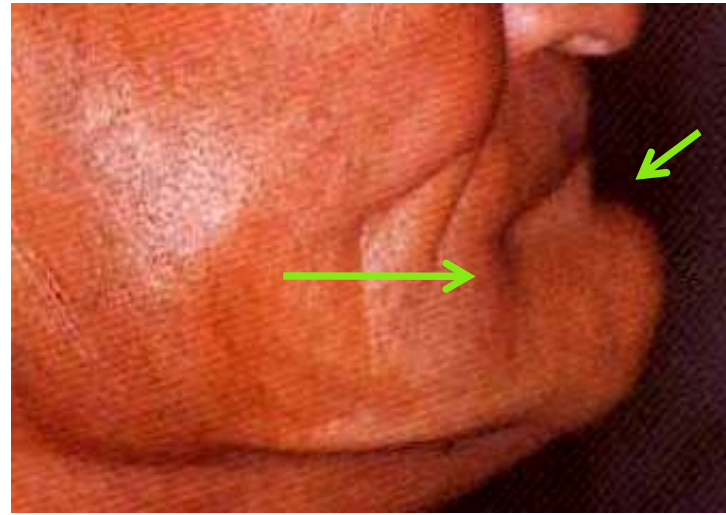
Proper vertical dimension



- **The angle of the mouth** —————> proper vertical dimension acts to reduce the wrinkles at the corners of the mouth and prevent their dropping.
- **The labiomentental angle** —————> normally obtuse angle is formed at the mentolabial sulcus. (flattened at high vertical dimension and acute at the low vertical dimension)



High V D



Low V D

2- Phonetics

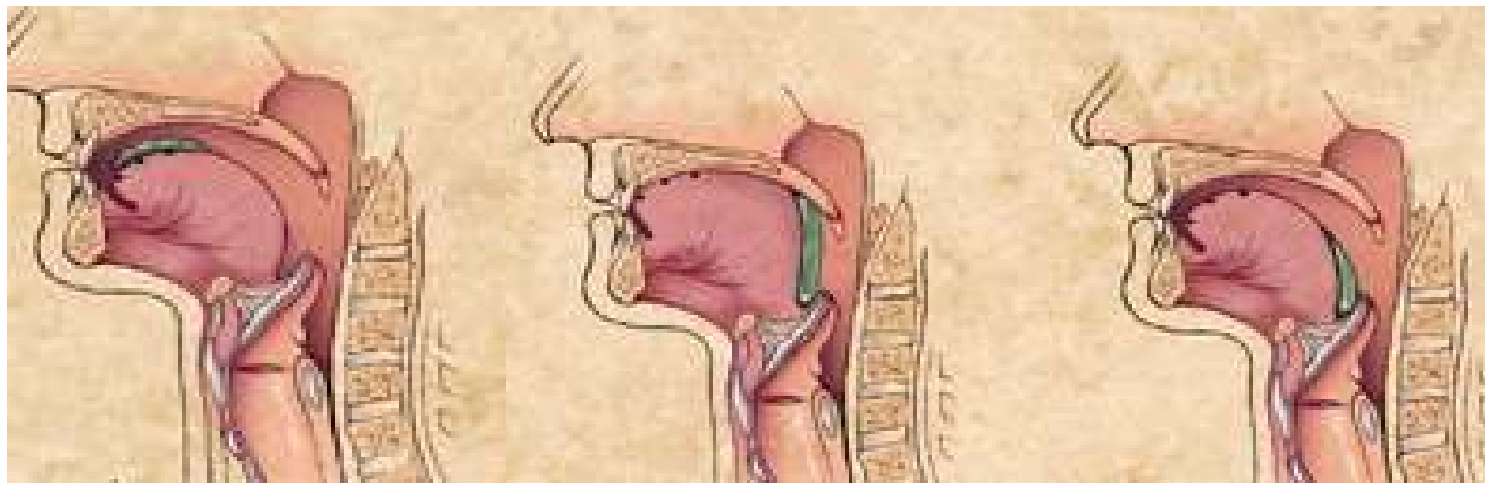
The mandible returned to the rest position after pronouncing the letter M.

3- patient 's tactile sense

by asking the patient to open widely in a strained position until uncomfortable position then close slowly to reach a relaxed position.

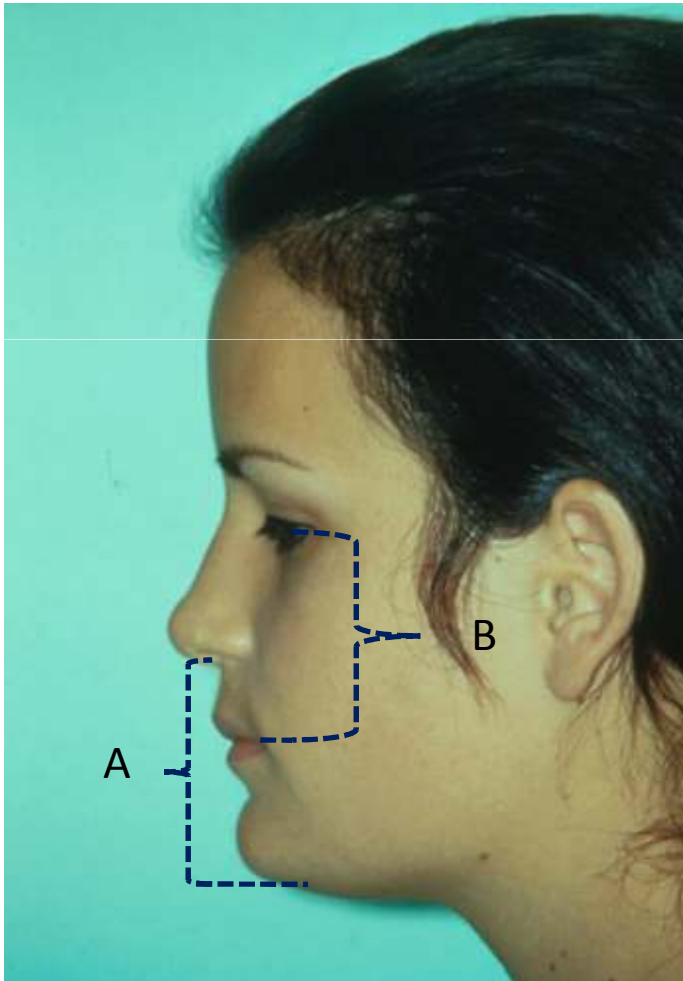
4- swallowing

the mandible moved from rest position to the occlusal contact position and back again during swallowing.

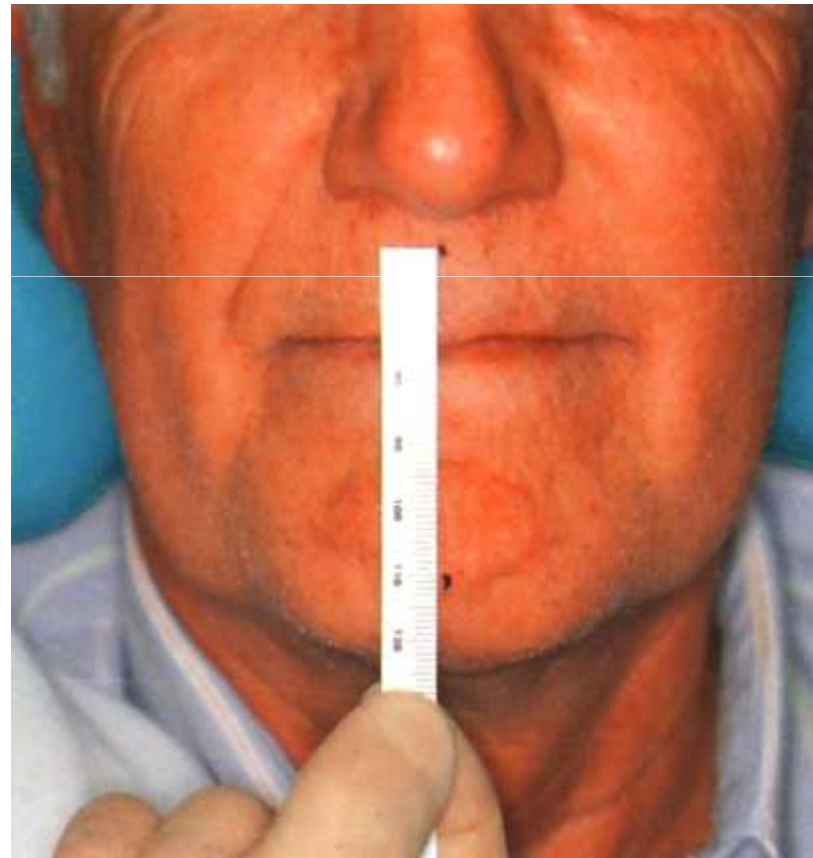


5- Facial Measurements

a. willi's measurements

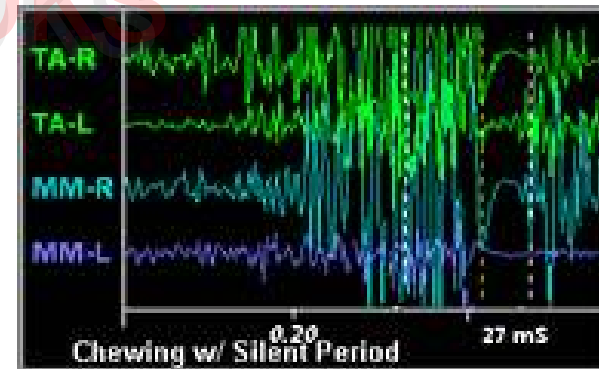


b. two dot technique



6- Electromyography

The use of electromyograph could be helpful to get the vertical dimension of rest as at this position the muscles showed minimal activity at electromyographic record.

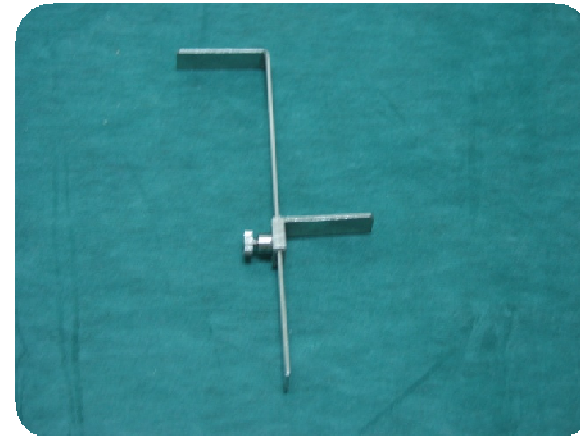


METHODS OF DETERMINING VERTICAL DIMENSION OF OCCLUSION

1) **Pre-extraction records**

a) **Willis gauge**

This device could used to measure V D O before teeth extraction and then recorded in the patient record.



b) Profile tracing:

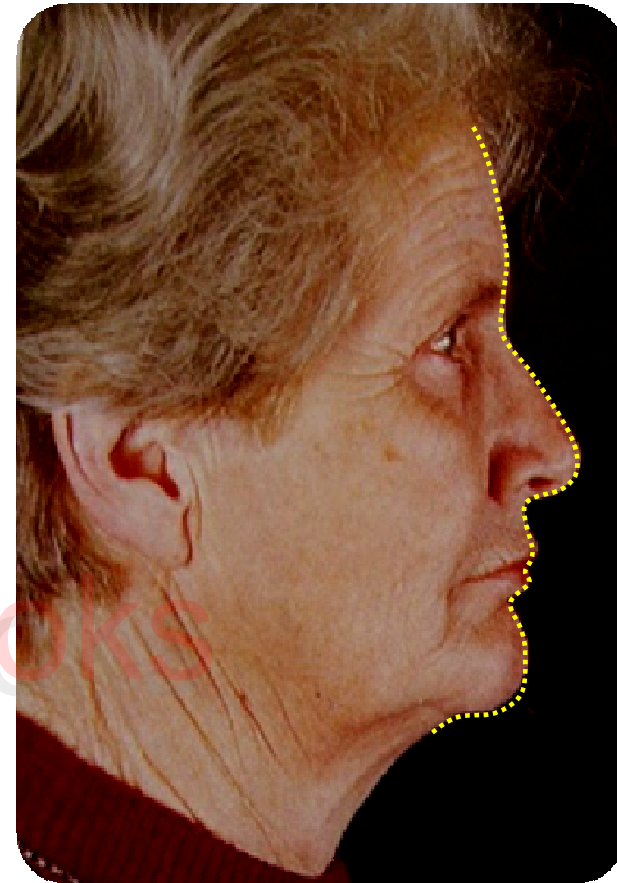
done using lead wire adapted to the patient profile before extraction

c) Face mask

clear acrylic resin mask could be made before extraction.

d) Articulated casts

- Allow determining vertical dimension
- Indicate the amount of vertical and horizontal overlap



e) Profile photograph

taken before teeth extractions. The distance between two fixed points is measured and then multiplied by factor.

f) Radiograph

patient's lateral cephalometric radiograph may be helpful.



2) Measurements of the former denture

the vertical dimension of occlusion could be measure from previous dentures this measured could be correlated with the patient's face observations.



3) *Power Point*

The use of power device (Boos Bimeter) to determine the vertical separation of the jaws at the maximum masticatory force.

4) *phonetics “Closest-speaking space”*

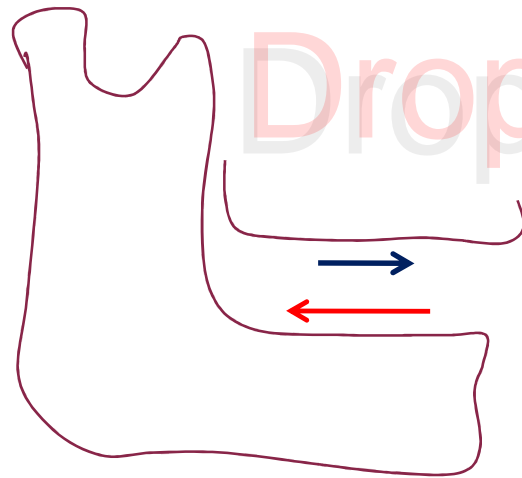
it is the relationship of the occlusal surfaces and incisal edges of the mandibular teeth to the maxillary teeth during function and rapid speech.

this is done by asking the patient to repeat words started with letter “S” and evaluate space between occlusal rims

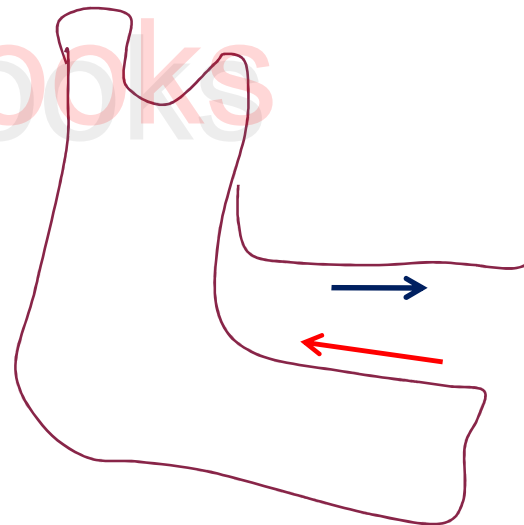


5) Ridge Relationship

it is suggested that parallelism of both arches is an indication of the correct vertical height.



Parallel ridges



Divergent ridges

